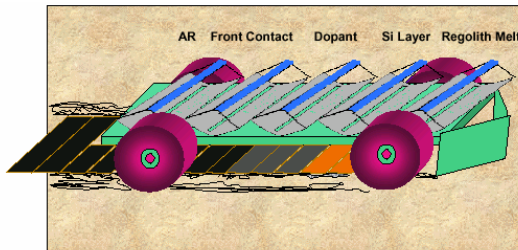


New Architecture for Space Solar Power Systems: Fabrication of Silicon Solar Cells using In-Situ Resources

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The human exploration and development of the solar system depends critically on the availability of electrical energy. In addition, the long term potential for humans to settle space requires self-sufficiency and therefore, self-sustaining electrical power systems. This can be attained through the application of a revolutionary new system architecture for access to electric power that utilizes the indigenous resources present on planets and their moons by an in situ power system emplacement through the fabrication of solar cells using thin film growth technology. On the Earth's Moon, thin film silicon-based solar cells will be fabricated from silicon, iron and other materials generated from the processing of the lunar regolith. The thin film solar cells will be deposited directly on the surface of the Moon over a period of time to form a power system that can reach 1 MW in several years, with the need to transport a very much smaller mass of equipment to the Moon than would otherwise be required. Similar technical approaches will work on Mars. This new electric power system architecture allows major reductions in cost of human habitation and space resource production by reducing space transportation costs, and will allow for human and robotic presence in space independent from Earth.



- Solar powered

Solar Electric Motion

Solar Thermal Evaporation

- Continuous lay-out of cells on lunar surface

- Remotely controlled

Terrestrial Material	Purpose	Lunar Material
Glass/Silicon	Substrate	Lunar Melted Glass
Silicon	Solar Cell Absorber	Silicon
Aluminum	Back Contact	Aluminum
Silver	Front Contact	Aluminum or Calcium
TiO ₂	Anti-Reflection Coating	TiO ₂ , Phosglass, or Geikelites (TiMgO mineral)
Boron	P-Type Dopant	Aluminum
Phosphorous	N-Type Dopant	Phosphorous
Copper	Cell Interconnects	Aluminum or Calcium